

8i hnYbXY'6i bXYgghUUhYb'j Yf_`U[Yb Hfi a d.'7\Ucg'Xi fWX'j YffØW_hY Nc``dc`]h]_°

9]b'8i hnYbX'l G!6i bXYgghUUhYb'j Yf_`U[h'X]Y'Hfi a d! FY[]Yfi b['k Y[Yb'fYWkhgk]Xf][Yf'Nc``dc`]h]_ž'X]Y'X]Y K]fhgWkUZh'XYghUV]`]g]Yfh"



BYk 'Mcf_ž'I G5'!' \data |hhYb'k UW\gYbXYf'GdUbbi b[Yb']b'XYf
Ua Yf]_Ub]gW\Yb'K |fhgW\UZh\\UVYb'\Yi hY'Y'Z'6i bXYgghUUhYb'?'U[Y
[Y[Yb'X]Y'Hfi a d!FY[]Yfi b['Y]b[YfY]W\h''8]Y'5b_`U[Y'k]fX'j cf
XYa 'I G!6i bXYg[Yf]W\h'Z\Of']bhYfbUh]cbU'Yb'< UbXY`']b'BYk 'Mcf_
j Yf\UbXY`h'i bX'f]W\hYh'g]W\'[Y[Yb'X]Y'U`g'W\Uch]gW\'i bX
fYW\hgk]Xf]['VYnY]W\bYhY'Nc``dc`]h]_'XYg'Df\hg]XYbhYb''8]Y'?`\h[Yf
Uf[i a Ybh]YfYbž'XUgg'X]YgY'Dc`]h]_'Ui Z'Hfi a dg' @Ui bYb 'VUg]YfY
i bX'b]W\h'Ui Z'Y]bYf'fYW\ha \ha \ha \angle][Yb'5i hcf]h\h'' \data gVYgcbXYfY'ghY\h
X]Y'6Y\Ui dhi b[']a 'FUi a ž'XUgg'XYf'Df\hg]XYbh'N\O``Y'k]``_\Of`]W\
Ui Z'; fi bX`U[Y'XYg'\data hYfbUh]cbU``9a Yf[YbWm'9Wcbca]WDckYfg
5Wh'f\data9DD5\L'Yf\YVYb'_Ubbz'k Ug']b'XYf'?`U[Y'U`g'fYW\hgk]Xf][

Ub[YZcWkhYb'k]fX"'K Y`h'VYf]WkhYhž'XUgg'X]Y'?`À[Yf']bgVYgcbXYfY X]Y'5i gZØ\fi b['XYf'NÒ``Y'U`g'JYfghc»'[Y[Yb'X]Y jYfZUggi b[ga À»][Y'CfXbi b['UbgY\Yb"

8]Y'_`U[YbXYb'6i bXYgghUUhYb'g]bX'i bhYf'UbXYfYa 'CfY[cbž 5f]ncbUž'7c`cfUXcž'7cbbYWh]W hž'8Y`Uk UfYž'=`]bc]gž'A U]bYž
A]bbYgchUž'BYj UXUž'BYk 'AYI]Wcž'BYk 'Mcf_'i bX'JYfa cbh''?f]g
AUmYgž'X]Y'; YbYfU`ghUUhgUbk À`h]b'j cb'5f]ncbUž'VYnY]WkbYhY
Hfi a dg'Nc``d`Ub'U`g' j YffØW_h 'i bX']``Y[U` ž'k À\fYbX
7cbbYWh]W hg'; YbYfU`ghUUhgUbk U`h`K]``]Ua 'Hcb['X]Y'NÒ``Y'U`g
Y]bY'?UhUghfcd\Y'ZØf': Ua]`]Yb'i bX'I bhYfbY\aYb'UVhUh''8]Y'?`U[Y
ZcfXYfh`XUfØVYf'\]bUi gž'XUgg'bi f'XYf'I G!?cb[fYgg'X]Y'6YZ[b]g
ni f'9f\YVi b['j cb'NÒ``Yb'\Uhž'XU'XYf'DfÀg]XYbh'g]W\bi f']b'Y]bYf
hUhgÀW\`]W\Yb'Bchg]hi Uh]cb'Ui Z'XUg'=99D5'VYfi ZYb'_Ubbž'X]Y'Y]bY
Ui »Yf[Yk Ò\b`]W\Y'6YXfc\i b['XUfghY``h'8]Y'NY]h'Yf`Ài hYfh
k Y]hYfž'XUgg'X]Y'?`À[YfY]bY'K]YXYf\YfghY``i b['XYf'Ni gh]a a i b[
XYg'?cb[fYggYg'ni 'NÒ``Yb'UbghfYVYb''

$K = \frac{1}{h} W U Zh^{2}W Y' : c^{2} Y b' X Y f' N c^{2} d c^{2} h]_{-}$

 $8]Y `Nc``dc`]h]_ "j cb`8 cbU`X `Hfi a d`\Uh`VYfY]hg`Yhnh`[fUj]YfYbXY 5i gk]f_i b[Yb`Ui Z'X]Y `I G!K]fhgW\UZh" `Ghi X]Y `nY][Ybž`XUgg`X]Y NÔ``Y `=a dcfhY `i a `a]bXYghYbg`&) `DfcnYbh'j YfhYi Yfbž'k Ug`g]W\bY[Uh]j `Ui Z'X]Y `9ZZ]n]Ybn`XYf`5fVY]hg_fÀZhY! `i bX`? Ud]hU`bi hni b[Ui gk]f_Yb`_Ubb`i bX`ni `g]b_YbXYb`FYU``Ô\bYb`ZØ\fh" `HUhgÀW\`]W\\UYPb`9I dYfhYb`ZYgh[YghY``hž`XUgg`XYf`<UbXY`g_f]Y[`i bhYf`Hfi a d_Y]bY`ni gÀhn`]W\Yb`\zVg`[YgW\UZYb`\Uhž`gcbXYfb'j]Y`a Y\f`XUgF]g]_c'j cb`5fVY]hgd`Uhnj Yf`i ghYb`]b`VYhfcZZYbYb`FY[]cbYbYf\Ô\hY" 8]Y`BNN`\YVh`\Yfj cfž`XUgg`X]Y`ni _ØbZh][Ybk]fhgW\UZh`]W\Yb`5i gg]W\hYb`Xi fW\X]Y`<UbXY`g_cbZ]_hY`i bXghY][YbXY`DfY]gY`Yf\YV`]W\VYY]bhfÀW\h][h'k YfXYb`_ÔbbhYb"$

; Uj]b B Yk gca ž XYf XYa c_fUh]gWXY; ci j YfbYi f j cb ? U`]Zcfb]Ybž \UhYVYbZU``g`? `U[Y [Y[Yb X]Y Nc ``dc `]h]_ 'Y]b[YfY]WXh" \dagger gY]bYf ? `U[Y k UfbhYfž XUgg ? U`]Zcfb]Yb 'U`g'[fÒ» hYf \dagger a dcfhYi f XYg @UbXYg dchYbn]Y```A]``]UfXYb 'Ub '9]bbU\a Yb j Yf`]YfYb '_ObbhY" 8 U Hfi a d 'Ub[Y_ØbX][h \ Uhž]bbYf\U`V XYf bAWXghYb K cWXYb bYi Y NO``Y ZYghni gYhnYbžgc``hY X]Y 'J Yf\UbX`i b[Yb a]h I bhYfbY\a Yb

cXYf'@ÀbXYfb'gW\Y]hYfbž']gh'X]Y'I bg]W\Yf\Y]h'[fc» "'Hfi a d'Yf_`ÀfhY ni XYa ž'XUgg'X]Y'I G5'i bX'7\]bU'k Y]hYf\]b'hÀ[`]W\']b'?cbhU_h ghØbXYbž'k À\fYbX'VYfY]hg'VYghY\YbXY'NÒ`Y'Ui Z'DfcXi _hY'Ui g 7\]bU'k]Y'9`Y_hfcb]_'j cb'V]g'ni '%() 'DfcnYbh'Y]bYb'\c\Yb'8fi W_Ui Z'X]Y'K]fhgW\UZh'Ui gØVYb"8]Y'G]hi Uh]cb']gh'Ub[YgdUbbhž'XUX]Y'A Àf_hY'bY[Uh]j 'Ui Z'X]Y'NÒ`Y'fYU[]Yfh'\UVYb'i bX'XYf'8c``Uf Ub'K Yfh'j Yf`cfYb'\Uh"

 $\pm 0.56 \text{ bVY hf UW} \text{ hi XY filb} \text{ Ui hY b XY big Ubbilis} \text{ b[Ybig b X][hYiY]b} \\ \text{GdfYW} \text{ Yf XY gik Y]} \text{ Ybis Ui gY gži? i glis Y gU]} \text{ zi Ubži X Uggi X]Y i Hfila d!} \\ \text{FY[]Yfilb[izY ghiY big Which ggy big Y]} \text{ zi XY bib Uh]} \text{ cb Ui YbiB chghUb Xini} \\ \text{VY_Aa dZYb'' 8]} \text{YgYi5 i ggU[Yigd]Y[YihiX]Yigf]} \text{high b[iXY filit]} \text{ yi b[YfYWhhid]} \text{ yi b[YfYWhhid]} \text{ yi b[YfYWhhid]} \text{ yi b[YfYWhhid]} \text{ high filit} \text{ yi yi b[YfYWhhid]} \text{ yi b[YfYWhhid]} \text{ yi b[YfYWhhid]} \text{ yi b[YfY big Whid]} \text{ yi b[YfY big Whid]} \text{ yi b[Yhid]} \text{ yi b[Yhid]}$

8 YhU]`g	
J c f ZU``	?`U[Y
Cfh	BYk Mcf_ži G5
EiY``Yb	• k k k "k Y`h"XY
	• k k k "nY]h"XY
	• k k k "bnn"VW

6 Ygi WX Yb 'G]Y 'i bg 'Ui Z 'b!U["XY